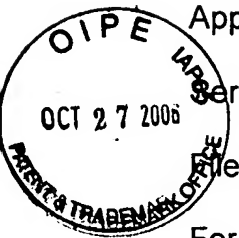


IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



Applicant : Dany PRIETO

Serial No. : Not Yet Assigned

Filed : Concurrently Herewith

For : DEVICE FOR FIXING IN A CONTAINER SUCH AS A METAL CAN A DEVICE  
AUTOMATICALLY EXTRACTING THE STRAW AND ITS ASSOCIATED DEVICE

CLAIM OF PRIORITY

Commissioner for Patents  
U.S. Patent and Trademark Office  
Customer Service Window, Mail Stop \_\_\_\_\_  
Randolph Building  
401 Dulany Street  
Alexandria, VA 22314

COPY

Sir:

Applicant hereby claims the right of priority granted pursuant to 35 U.S.C. 119  
based upon French Application No. 99/11190, filed August 31, 1999. As required by 37  
C.F.R. 1.55, a certified copy of the French application has been filed in parent Application  
No. 10/069,614.

Respectfully submitted,  
Dany PRIETO

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October 27, 2006  
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DEVICE FOR FIXING IN A CONTAINER SUCH AS A METAL CAN A  
DEVICE AUTOMATICALLY EXTRACTING THE STRAW, AND ITS  
ASSOCIATED DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application is a divisional of parent U.S. application No. 10/069,614, filed September 10, 2002, which is a National Stage Application of International Application No. PCT/IB00/01205, filed August 30, 2000. Further, the present application claims priority under 35 U.S.C. § 119 of French Patent Application No. 99/11190 filed on August 31, 1999.

BACKGROUND OF THE INVENTION

COPY

1. Field of the Invention

[0002] The present invention relates to a method of positioning in a container, such as a can, a device for automatically extracting a straw, and its associated device.

2. Discussion of Background Information

[0003] Numerous types of containers are commercially available: plastic bottles, glass bottles, metallic cans, cardboard packagings which can have various shapes allowing for the packaging of any type of liquid food products.

[0004] These various containers have the disadvantage, for the user, of being either unhealthy when one wishes to drink straight from the container, or impractical depending on the shape and size of the neck, or the shape of the container itself.

[0005] In the particular case of metallic cans or cardboard packagings used for diverse and varied beverages, such as beers, sodas, fruit juices, or milk, they are very unhealthy. Indeed, from the locations where they are produced, after the beverage has been packaged, they are transported and unloaded without any specific hygienic measure, and then sold to the consumer by a retailer who stores them without any particular hygienic precaution and handles them manually. During these various manipulations, various microbes, viruses, bacteria or dust can be deposited on the walls of the containers, which are ingested by the consumer when he places his lips on the container.

[0006] Furthermore, in the particular case of metallic cans, and independently of hygiene problems, the consumer can be hindered when drinking the beverage by problems of ill-timed flow, which most often leaves

stains on his clothes.

**[0007]** Therefore, a device for automatically extracting a straw has been developed to equip the cylindrical metallic cans of the type having a container closed by a crimped cover, which includes opening means constituted of a push ring adapted to displace a precut tongue inward of the can.

**[0008]** Such an extraction device is described, for example, in the published French Patent No. 2 772 731, and includes a straw-supporting member constituted by an elastically deformable retention arm, one of the ends of which is connected to a peripheral ring, and the other of which includes means for retaining the straw. The peripheral ring is adapted to be sandwiched between the cover and more particularly its crimping groove and the upper peripheral rim of the container, whereas the retention arm is tensioned before being displaceably positioned and placed in support on a fixed abutment affixed to the peripheral ring. Such a method, which consists of deforming the arm before it is positioned beneath the cover requires a complex, expensive, and unreliable assembly line, particularly in view of the imposed high filling rates.

**[0009]** The present invention therefore proposes to resolve these disadvantages by proposing a device without fixed abutment for the deformed straw retention arm, and its embodiment method.

#### SUMMARY OF THE INVENTION

**[0010]** According to one aspect of the invention, there is provided a method of positioning, in a can including a container closed by a cover, a device for automatically extracting a straw. The device is of the type which includes a straw-supporting member constituted by an elastically deformable retention arm adapted to be tensioned by elastic deformation. The arm includes a retention tube for the straw. The method is characterized in that it provides for tensioning the arm by the direct or indirect effect of the cover during the coupling of the cover to the device.

**[0011]** The method includes the following preliminary steps:

- a. fixing or securing the straw to the retention arm to form an intermediate subassembly, namely, the straw-extraction device subassembly; and
- b. coupling of the intermediate subassembly to the cover to form a closure subassembly;

the method may also include the following complementary steps:

- c. filling up the container with the desired beverage;
- d. positioning the closure subassembly in the container;
- e. crimping the cover on the container.

**[0012]** According to another aspect of the invention, the method provides for tensioning the retention arm by the action of the cover on a projection affixed to the retention arm, or on the straw retained by the arm.

**[0013]** The invention also relates to a device for extracting a straw adapted to implement the method, which comprises a straw-supporting member constituted by an elastically deformable retention arm, one of the ends of which is connected to a peripheral ring or annular ring, whereas the free end of the arm includes a mechanism for retaining the straw.

**[0014]** According to another aspect of the invention, the mechanism for retaining the straw includes a retaining tube portion.

**[0015]** According to another aspect of the invention, the device is obtained in a single piece made of injected plastic material, whereas the annular ring includes a succession of deformable lips that are peripherally sandwiched, during the crimping of the can, between the cover and more particularly its crimping groove and the upper peripheral rim of the opening of the container.

**[0016]** The invention also provides for a method of coupling a device for automatically extracting a straw in a container to a cover, wherein the device includes a straw-supporting member that is adapted to be subjected to elastic deformation, and wherein the method includes coupling together the cover and the device and causing the straw supporting member to move from a first position to a second position.

**[0017]** The causing may comprise one of deflecting the straw supporting member and tensioning the straw supporting member. The straw supporting member may move from the first position to the second position when, directly or indirectly, the cover is coupled to the device. The straw supporting member may comprise an elastically deformable retention arm that is adapted to be tensioned by elastic deformation. The elastically deformable retention arm may include a retention mechanism adapted to retain the straw. The method may further comprise fixing the straw to the straw-supporting member to thereby form an intermediate subassembly and coupling of the intermediate subassembly to the cover to form a closure subassembly. The fixing may comprise fixing the straw

to an elastically deformable retention arm of the straw-supporting member to thereby form an intermediate subassembly.

**[0018]** The method may further comprise filling a container with a desired beverage, positioning the closure subassembly in the container, and securing the cover on the container. The securing may comprise crimping the cover on the container.

**[0019]** The straw-supporting member may comprise an elastically deformable retention arm having a projection and the method may further comprise engaging the cover with the projection, whereby the elastically deformable retention arm is deflected or tensioned. The straw-supporting member may comprise an elastically deformable retention arm and the method may further comprise engaging the cover with the straw, whereby the elastically deformable retention arm is deflected or tensioned.

**[0020]** The invention also provides a device for extracting a straw comprising a straw-supporting member having an elastically deformable retention arm which comprises a free end and at least another end. A body comprises one of a peripheral portion and an annular portion. The at least another end of the elastically deformable retention arm is connected to the body. The free end includes a straw retaining mechanism. The device is adapted to be coupled to a container.

**[0021]** The straw retaining mechanism may comprise a retaining tube portion. The straw retaining mechanism may be made as a single piece. The straw retaining mechanism may comprise an injected plastic material. The body may comprise a succession of deformable lips, whereby the deformable lips are adapted to be peripherally sandwiched upon crimping of a cover onto a container. The deformable lips may be adapted to be peripherally sandwiched between a crimping groove and an upper peripheral rim of the container. The straw retaining mechanism may comprise a retention arm and an actuation arm that is adapted to be actuated and displaced during an opening of the container.

The straw retaining mechanism may comprise a first and a second elastically deformable zone, the first elastically deformable zone enabling a retention arm to move in a first pivoting direction and the second elastically deformable zone enabling a retention arm to move in a second pivoting direction. The first pivoting direction may comprise movement about a vertical pivoting axis, and the

second pivoting direction may comprise movement about a horizontal pivoting axis.

**[0022]** The invention also provides for a method of coupling a device for automatically extracting a straw to a cover, wherein the device includes a straw-supporting member that is adapted to be subjected to elastic deflection, wherein the method comprises coupling together the cover and the device and causing the straw supporting member to move from a first position to a second position.

**[0023]** The straw supporting member may move from the first position to the second position when the cover is coupled to the device. The straw supporting member may comprise an elastically deflecting retention arm. The elastically deflecting retention arm may include a retention mechanism adapted to retain the straw. The method may further comprise fixing the straw to the straw-supporting member to thereby form an intermediate subassembly and coupling of the intermediate subassembly to the cover to form a closure subassembly. The fixing may comprise fixing the straw to an elastically deflecting retention arm of the straw-supporting member to thereby form an intermediate subassembly. The method may further comprise filling a container with a desired beverage, positioning the closure subassembly in the container, and securing the cover on the container.

**[0024]** The invention also provides a device for extracting a straw comprising a straw-supporting member having an elastically deflectable retention arm which comprises a free end and at least another end. A body comprises one of a peripheral portion and an annular portion. The at least another end of the elastically deformable retention arm is connected to the body. The free end includes a straw retaining mechanism. The device is adapted to be coupled to at least one of the cover and a container. The straw retaining mechanism may comprise a retaining tube portion. The body may comprise a succession of deformable lips, whereby the deformable lips are adapted to be peripherally sandwiched upon crimping of a cover onto a container. The straw retaining mechanism may comprise a retention arm and an actuation arm that is adapted to be actuated and displaced during an opening of the container. The straw retaining mechanism may comprise a first and a second elastically deflectable zone, the first elastically deflectable zone enabling a retention arm to move in a first pivoting direction and the second elastically deflectable zone enabling a

retention arm to move in a second pivoting direction.

**[0025]** According to a preferred embodiment of the device, the retaining arm includes an actuation arm adapted to be actuated and displaced by the cover during the opening of the can, whereas the elastic connection of the retention arm to the peripheral ring is obtained by the succession of two elastically deformable zones: a first deformation zone enabling the arm to move in horizontal pivoting about a vertical pivoting axis, and a second deformation zone, distinct from the first deformation zone, enabling the arm to move in vertical pivoting about a horizontal pivoting axis.

**[0026]** Other characteristics and advantages of the invention will become apparent from the description that follows, with reference to the annexed drawings, which are only provided by way of non-limiting examples.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0027]** Figures 1 and 2, respectively, show a perspective view of the opening of a container such as a metallic cylindrical can including the device of the invention wherein:

Figure 1 shows the sealed can;

Figure 2 shows the open can, once the cap has enabled the straw to project out of the opening;

Figures 3, 4, 5, 6, 6a and 7 show a first embodiment of the extraction device;

Figures 8, 9, 10, 11, 11a and 12 show a second embodiment of the extraction device;

Figures 13, 14, 15, 16, 17 and 18 show the phases of the method, using the first embodiment of the extraction device;

Figures 19, 20, 21, 22, 23, and 24 show the phases of the method, using the second embodiment of the extraction device; and

Figure 25 is a perspective bottom view of an alternative of the second embodiment of the device.

#### DETAILED DESCRIPTION OF THE INVENTION

**[0028]** The invention relates to a method of positioning a straw automatic extraction device, generally designated by the reference numeral 1. The device is adapted to automatically extract, when it is being opened, a straw 2 arranged within a container 3. The extraction device 1 is advantageously described in the particular case of metallic cylindrical cans whose opening systems are

constituted in a known fashion by a push ring 4 and a precut tongue 5, also called a cap. The cap 5 can pivot inwardly of the container 3 under the effect of the ring to free the orifice 6 of the opening system, as shown in Figures 1 and 2.

It is understood that the automatic extraction device 1 according to the invention could be modified to be adapted to other types of containers, or to other types of opening systems without leaving the scope of protection of the invention.

**[0029]** The extraction device 1 is adapted to be used with the method of the invention and comprises a straw-supporting member 7 constituted by an elastically deformable retention arm 8, one of the ends of which is connected to a peripheral ring or annular ring 9. Furthermore, the free end of the arm 8 includes a mechanism for retaining the straw 2, which includes a retaining tube portion 10 that is advantageously open to provide it with enough elasticity to ensure pinching of the straw 2.

**[0030]** The extraction device 1 is advantageously obtained or made in a single piece of injected plastic material. The annular ring 9 includes a succession of deformable lips 15 that are peripherally sandwiched during the crimping of the can 3 between the cover 14, and more particularly its crimping groove and the upper peripheral rim of the opening of the container 3, as seen in Figures 6a and 11a.

**[0031]** In a first embodiment of the extraction device 1 shown in Figures 3-7, the mechanism 10 for retaining the straw is extended upwardly by a projection 11 for deforming the arm that extends upwardly.

**[0032]** The projection 11 is constituted by a cylindrical wall portion whose upper end 12 is adapted to come into abutment on the lower wall 13 of the cover 14 during its coupling to the device 1, as shown in Figures 6 and 16, and, of course, during the crimping of the cover 14, thus causing the downward deformation along direction F of the arm 8, as shown in Figure 6 and Figure 16.

**[0033]** In a second embodiment of the extraction device 1 shown in Figures 8-12, the retention arm 8, and more particularly its retaining mechanism 1, does not include a deforming projection. According to this alternative embodiment, the deforming of the arm occurs by the direct effect of the cover on the straw. Furthermore, the arm 8 includes an actuating arm 18 that is adapted to be actuated and displaced by the cap or tongue 5 during the opening of the can. In this alternative embodiment, the elastic linkage of the retention arm 8 with the



peripheral ring 9 is obtained by the succession of two elastically deformable zones: a first deformation zone 16 for enabling the retention arm 8 to displace in horizontal pivoting about a vertical pivoting axis  $XX'$ , and a second deformation zone 17, distinct from the first deformation zone 16, for enabling the arm 8 to displace in vertical pivoting about a horizontal pivoting axis  $YY'$ . It is noted that the second deformation zone 17 is a deformable flat section, but it could have any other shape, and may, in particular, have a arrangement similar to that which is shown in Figure 25.

**[0034]** In the two embodiments of the extraction device 1, it is noted that in the non-stress rest position, as shown in Figures 3, 4, 5, 7, 8, 9, 10, 12, 13, 14, 15, 19, 20, and 21, the retention arm 8 extends from the peripheral ring inwardly, substantially horizontally, at least in a plane substantially parallel to the general plane H of the ring 9.

**[0035]** Conversely, in the prestress active position, as shown in Figures 6, 11, 16, 17, 22, 23, and 24, the retaining arm 8 forms, together with the general plane H of the peripheral ring 9, a sharp angle A comprised between 20 and 60 degrees and, for example, 40 degrees.

**[0036]** According to one method of positioning the extraction device 1, the retention arm 8 is elastically biased downwardly along direction F, such that, during opening, this elasticity is restored in order to have the straw 2 move or be extracted out of the opening 6, as shown in Figures 6, 11, 16 and 22 .

**[0037]** The stressing of the arm is done at the time the cover 14 is coupled to the device 1, as shown in Figures 6, 11, 16, 17, 22, and 23 by the direct or indirect effect of the cover 14 on the retention arm 8.

**[0038]** With the first embodiment of the device 1, the lower wall 13 of the cover 14 biases the retention arm 8 into a downward elastic prestress by its direct effect on the end 12 of the projection 11 for deforming the arm.

**[0039]** With the second embodiment of the device 1, the lower wall 13 of the cover 14 biases the retention arm 8 into a downward elastic prestress by its direct effect on the end 21 of the straw 2 retained by the tubular retaining portion 10.

**[0040]** It is understood that with the first embodiment of the extraction device 1, during the opening of the can, the cap or tongue 5 releases the retention arm 8 of the straw 2 which, having been elastically prestressed, returns to its inactive

position to drive with it the end of the straw 2 which then projects out of the opening 6.

**[0041]** With the second embodiment of the extraction device 2, the end of the actuation arm 18 is arranged in the trajectory of the cap or tongue 5. Thus, during opening of the can, the cap or tongue 5 acts on or engages the actuation arm 18 to pivot the assembly which it forms with the retention arm 8 about the axis XX', and thus to place the end of the straw 2 in the zone of the opening 6. In this way, the straw 2 is allowed to project immediately through this opening 6 by the release of the prestress.

**[0042]** According to one embodiment, the invention provides for a method that includes the following preliminary steps:

a. Securing the straw 2 to the retention arm 8 by introducing the straw 2 into the retention tube 10 to form an intermediate subassembly 30, namely, the straw 2 and the extraction device 1 subassembly.

During this operation, it should be ensured that the straw 2 extends upwardly by an adequate height L comprised between 10 and 25 millimeters (see Figures 13, 14, and Figures 19 and 20).

b. Coupling the intermediate subassembly 30 to the cover 14 to form a closure subassembly 41.

In this step, the subassembly 30 is engaged beneath the cover 14 and clipped to the latter by cooperation of the succession of lips 15 with the peripheral groove 31 of the cover (see Figures 15, 16, and Figures 21 and 22). Of course, the positioning of the device with its straw with the cover is done with a relative predetermined angular orientation. During the clipping of the subassembly 30 to the cover 14, the lower wall 13 of the latter, directly or indirectly, forces the retention arm 8 downwardly so as to place it in the prestress position, as shown in Figures 6, 16, and Figures 11 and 22.

**[0043]** During the bottling itself, the following complementary successive steps are undertaken:

c. filling the container 3 with the desired beverage;

d. positioning the closure subassembly 41 in the container 3, as shown in Figures 17, 18, and Figures 23 and 24; and

e. crimping the cover 14 on the container 3.

**[0044]** In the alternative embodiment shown in Figure 25, the second

deformation zone 17 is a hollow open section, especially omega-shaped so as to provide the zone with appropriate elasticity.

**[0045]** The straw 2 used is advantageously a telescopic, flexed straw, i.e., one which includes a deformation accordion.

**[0046]** It is noted that the device can include a guiding ramp 90 for the end of the straw 2, as seen in Figures 9, 10, and 25.

**[0047]** Of course, the invention is not limited to the embodiments described and shown by way of examples, but it also includes all of the technical equivalents, as well as their combinations.

WHAT IS CLAIMED:

1. A method of positioning, in a can including a container closed by a cover, a device for automatically extracting a straw that includes a straw-supporting member comprising an elastically deformable retention arm and a straw retaining portion, the method comprising one of:

placing the elastically deformable retention arm in tension when the cover is coupled to the device for automatically extracting a straw;

causing deflection of the elastically deformable retention arm with the cover when the cover is coupled to the device for automatically extracting a straw;

forcing downwards the elastically deformable retention arm with the cover when the cover is coupled to the device for automatically extracting a straw; and

prestressing the elastically deformable retention arm with the cover when the cover is coupled to the device for automatically extracting a straw.

2. The method of claim 1, wherein the tensioning results from direct or indirect effect of the cover.

3. The method of claim 1, wherein the tensioning results from direct effect of the cover.

4. The method of claim 1, wherein the tensioning, the deflection, the forcing or the prestressing results from contact between an upper end of the straw retaining portion and a lower surface of the cover.

5. The method of claim 1, further comprising:

before the placing, the causing, the forcing, or the prestressing, fixing the straw to the straw retaining portion.

6. The method of claim 1, further comprising:

filling the container with a beverage.

7. The method of claim 1, further comprising:

before the placing, the causing, the forcing, or the prestressing, filling the container with a beverage.

8. The method of claim 1, further comprising:  
crimping the cover on the container.

9. The method of claim 8, further comprising:  
before the placing, the causing, the forcing, or the prestressing, filling the  
container with a beverage.

10. The method of claim 1, wherein the tensioning, the deflection, the  
forcing or the prestressing results from contact between a projection coupled to  
the elastically deformable retention arm and the cover.

11. The method of claim 1, wherein the straw supporting member further  
comprises one of a peripheral ring and annular ring.

12. The method of claim 1, wherein the elastically deformable retention  
arm has one end coupled to the peripheral ring and the annular ring.

13. The method of claim 1, wherein the straw retaining portion comprises  
a retaining tube portion.

14. The method of claim 1, wherein the straw supporting member is a one  
piece member made of injected plastic material.

15. The method of claim 14, wherein the straw supporting member further  
comprises one of a peripheral ring and annular ring and a succession of  
deformable lips that are peripherally sandwiched during crimping of the cover  
onto the can.

16. The method of claim 14, wherein the straw supporting member further  
comprises one of a peripheral ring and annular ring and a succession of  
deformable lips that are peripherally sandwiched during crimping of a sealing  
groove of the cover onto the can.

17. The method of claim 1, wherein the elastically deformable retention  
arm includes an actuation arm adapted to be actuated and displaced by the cap

during an opening of the can.

18. The method of claim 1, further comprising connecting the elastically deformable retention arm with a peripheral ring using two elastically deformable zones.

19. The method of claim 1, wherein one of the two elastically deformable zones comprises a first deformation zone enabling the elastically deformable retention arm to move in horizontally about a vertical pivoting axis (XX'), and a second deformation zone, distinct from the first deformation zone, enabling the elastically deformable retention arm to move in vertically about a horizontal pivoting axis (YY').

20. A method of positioning a device for automatically extracting a straw between a container and a cover for the container, wherein the device for automatically extracting a straw includes a deflectable arm and a straw retaining portion, the method comprising one of:

placing the deflectable arm in tension when the cover is coupled to the device for automatically extracting a straw;

causing deflection of the deflectable arm with the cover when the cover is coupled to the device for automatically extracting a straw;

forcing downwards the deflectable arm with the cover when the cover is coupled to the device for automatically extracting a straw; and

prestressing the deflectable arm with the cover when the cover is coupled to the device for automatically extracting a straw.

21. A method of positioning a device for automatically extracting a straw between a can and a cover for the can, wherein the device for automatically extracting a straw includes a deflectable arm having one end coupled to a peripheral ring and another end coupled to the straw retaining portion, the method comprising one of:

placing the deflectable arm in tension when the cover is coupled to the device for automatically extracting a straw;

causing deflection of the deflectable arm with the cover when the cover is coupled to the device for automatically extracting a straw;

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forcing downwards the deflectable arm with the cover when the cover is coupled to the device for automatically extracting a straw; and

prestressing the deflectable arm with the cover when the cover is coupled to the device for automatically extracting a straw.

ABSTRACT OF THE DISCLOSURE

Method of positioning, in a can including a container closed by a cover, a device for automatically extracting a straw that includes a straw-supporting member including an elastically deformable retention arm and a straw retaining portion. The method includes one of placing the elastically deformable retention arm in tension when the cover is coupled to the device for automatically extracting a straw, causing deflection of the elastically deformable retention arm with the cover when the cover is coupled to the device for automatically extracting a straw, or forcing downwards the elastically deformable retention arm with the cover when the cover is coupled to the device for automatically extracting a straw.



Applicant did not intend to abandon the instant application and is herein requesting withdrawal of the holding of abandonment or alternatively petitioning to revive the abandoned application under 37 CFR 1.137(b).

Pursuant to 37 CFR 1.137(b)(1), Applicant is herein submitting a reply as required by the non-final Office Action dated February 27, 2006. The reply is in the form of a concurrently filed divisional application (a copy of the divisional application having Attorney Docket No. P30729 is attached hereto).

Pursuant to 37 CFR 1.137(b)(2), Applicant is herein submitting the fee as set forth in 37 CFR 1.137(b)(2) in the amount of \$ 750.00.

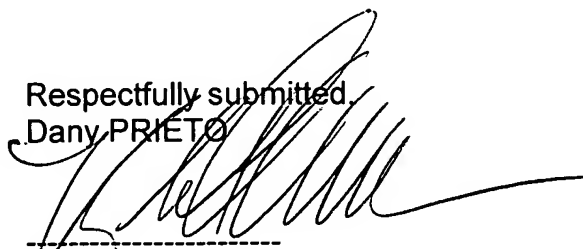
Pursuant to 37 CFR 1.137(b)(3), Applicant submits that the entire delay in filing the required reply from the due date for the reply (i.e., August 28, 2006) until the filing of the instant grantable petition was unintentional.

Applicant submits that a terminal disclaimer pursuant to 37 CFR 1.137(b)(4) is not required for the instant application.

Should there be any questions or comments, the Examiner is invited to contact the undersigned at the below-listed telephone number.

This request is timely since it is filed within 2 months from the date of the application became abandoned.

Respectfully submitted,  
Dany PRIETO



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FIG 1

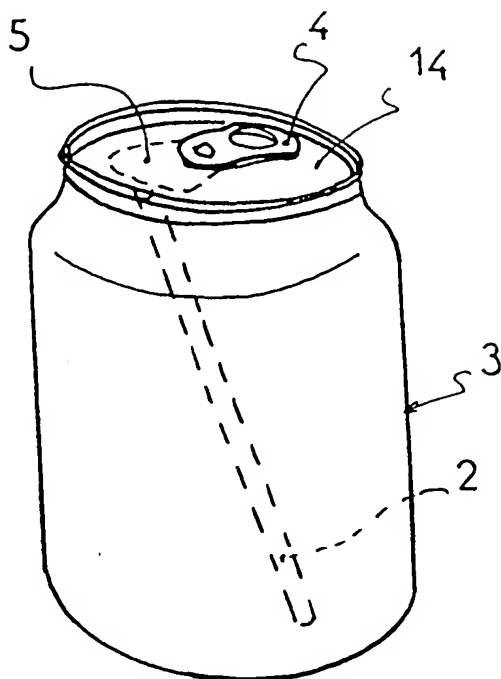
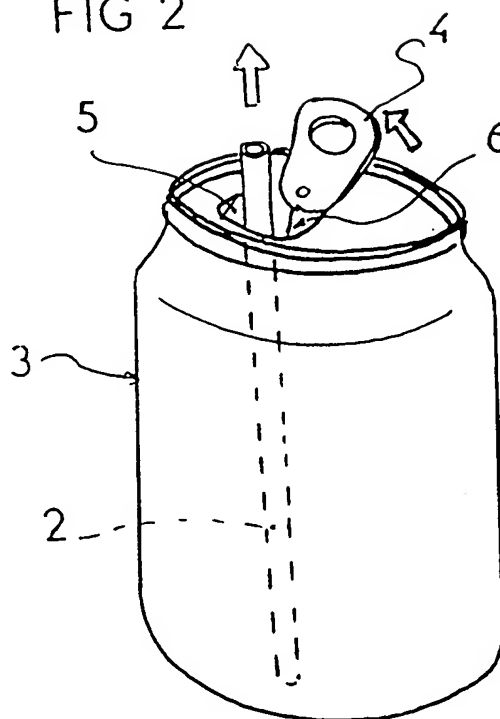


FIG 2



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FIG 3

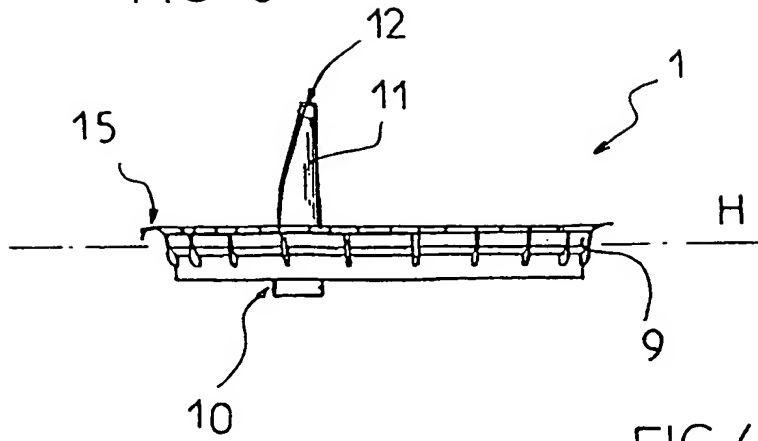


FIG 4

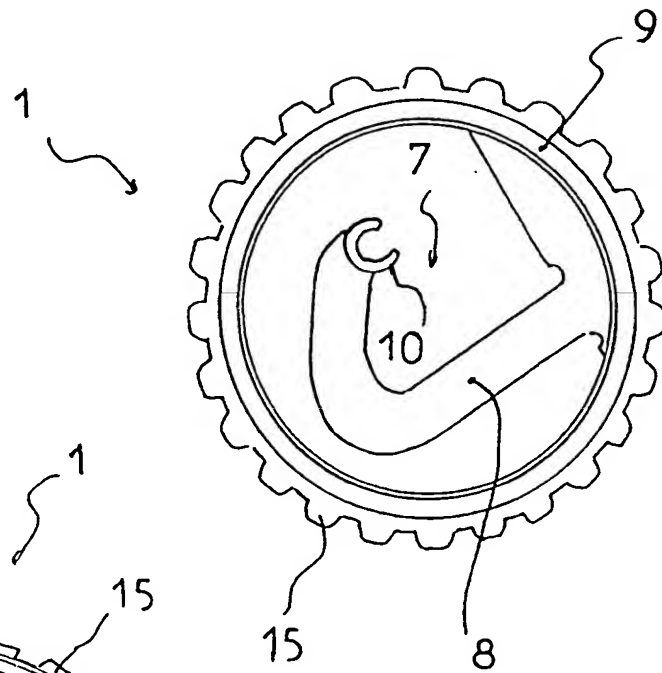
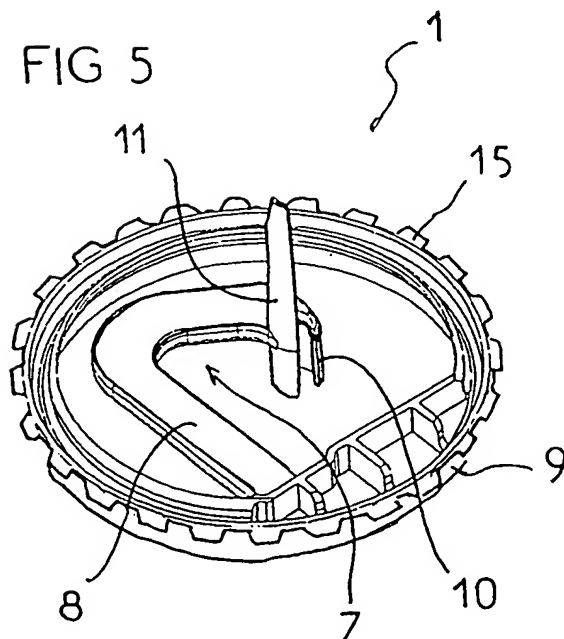


FIG 5



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FIG 6

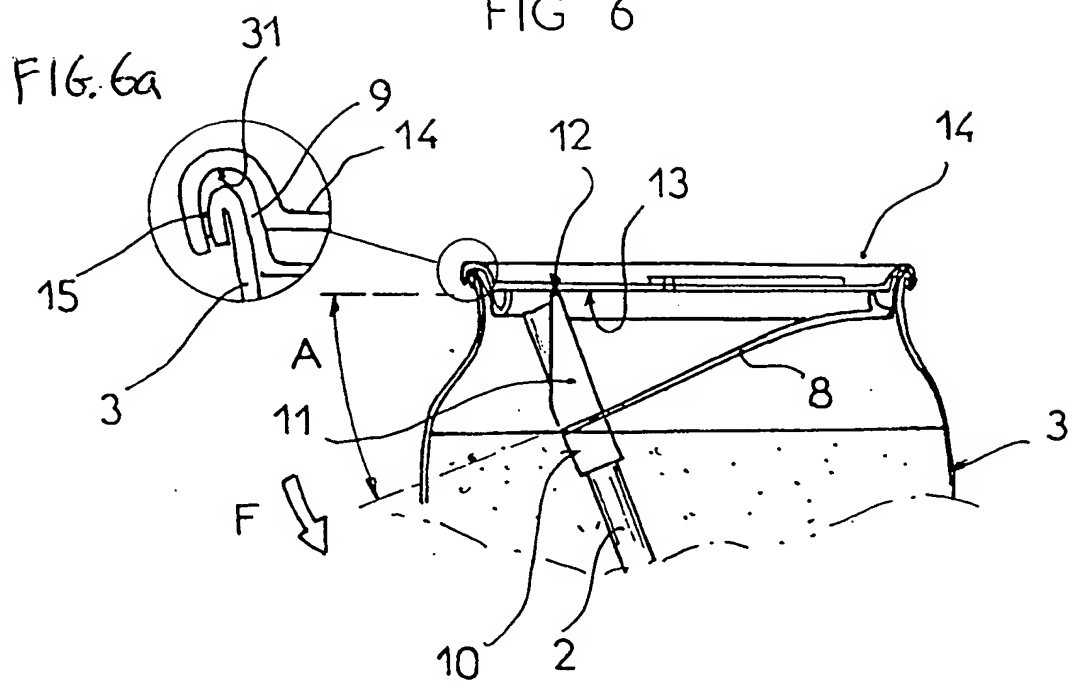
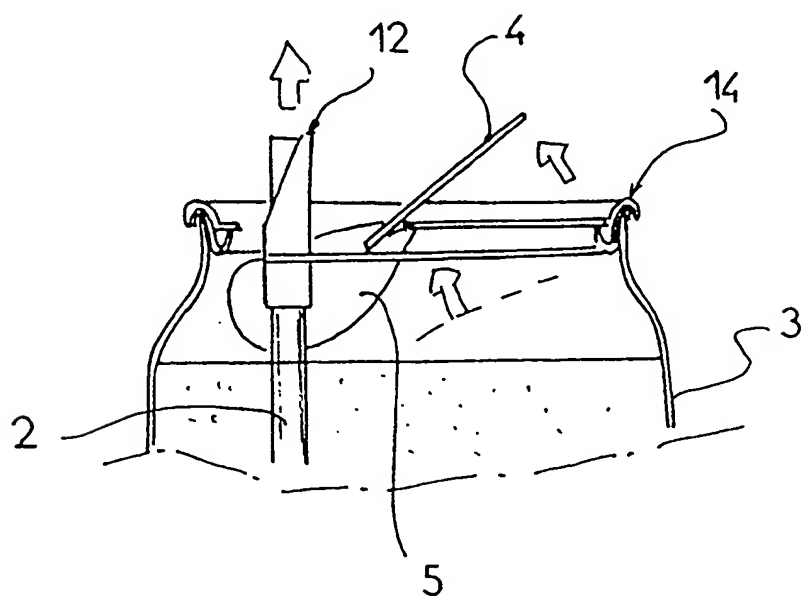


FIG 7



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FIG 8

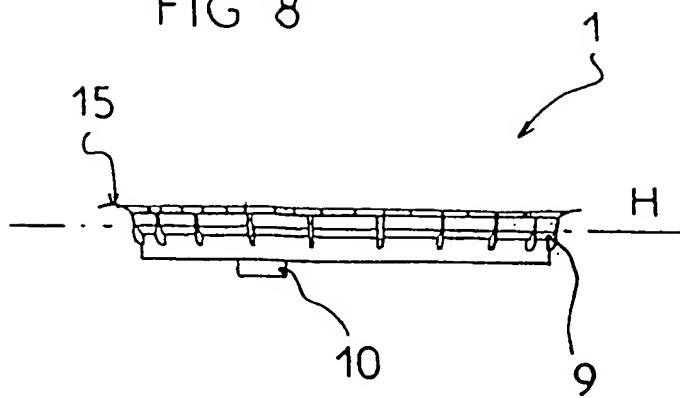


FIG 9

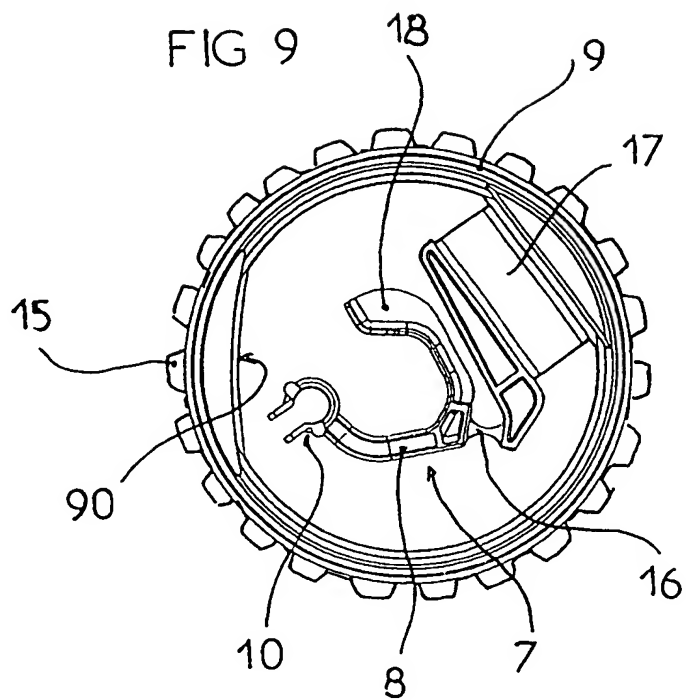
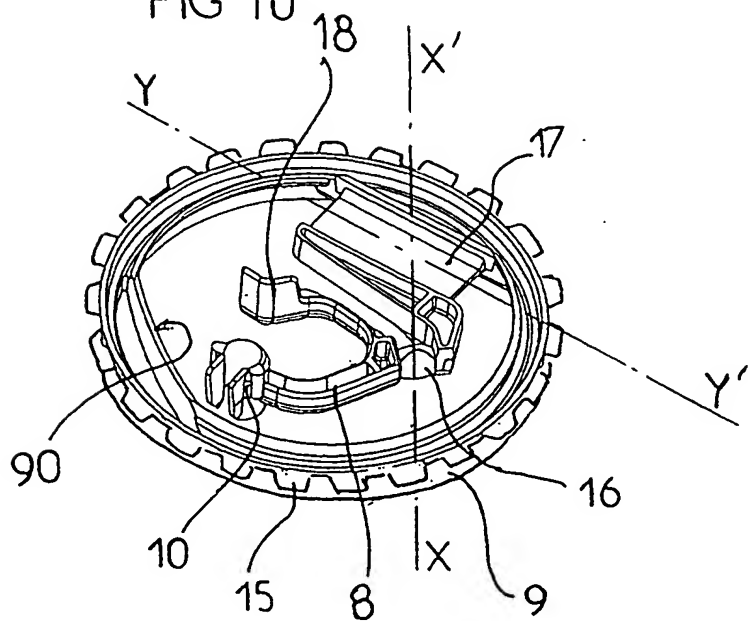
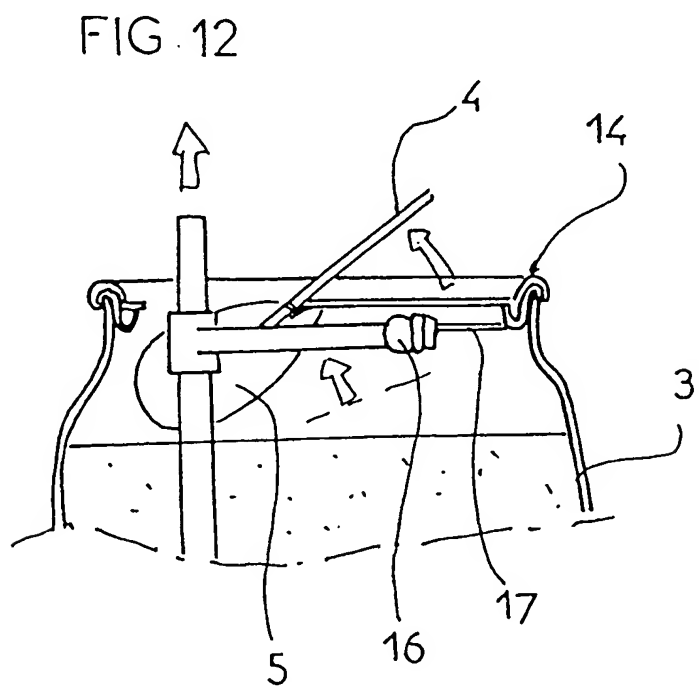
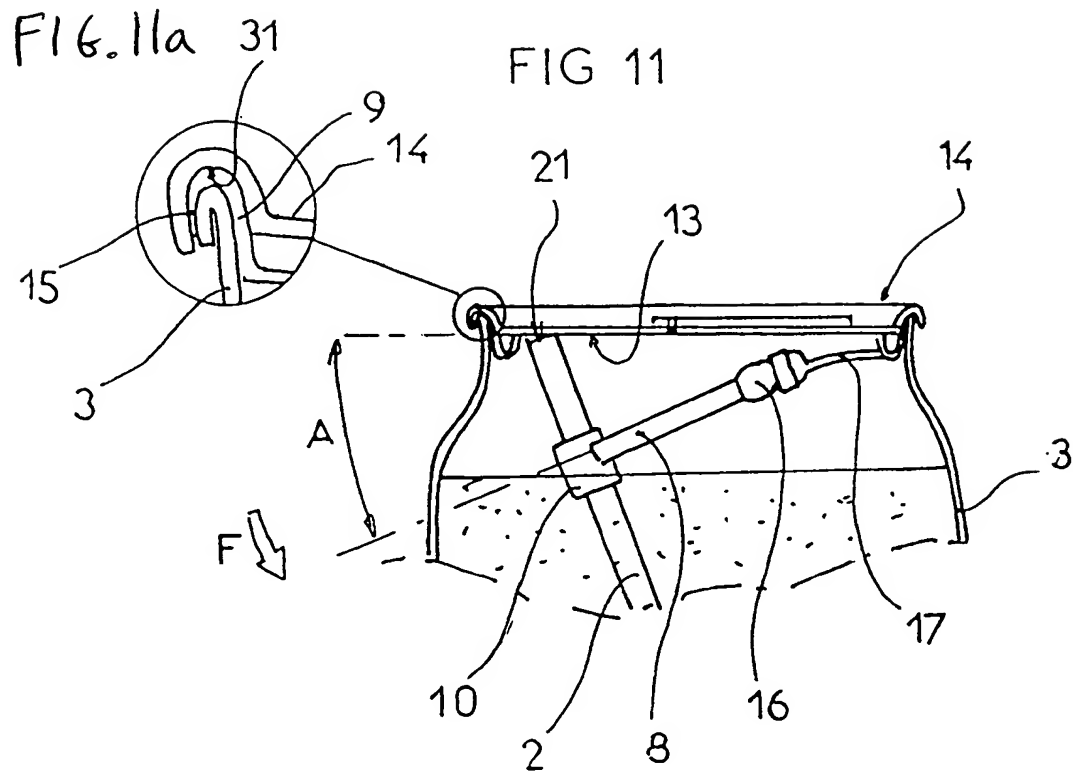


FIG 10



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FIG 13

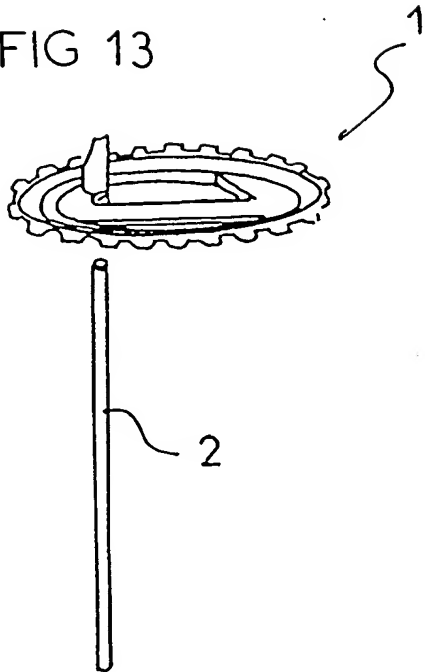


FIG 14

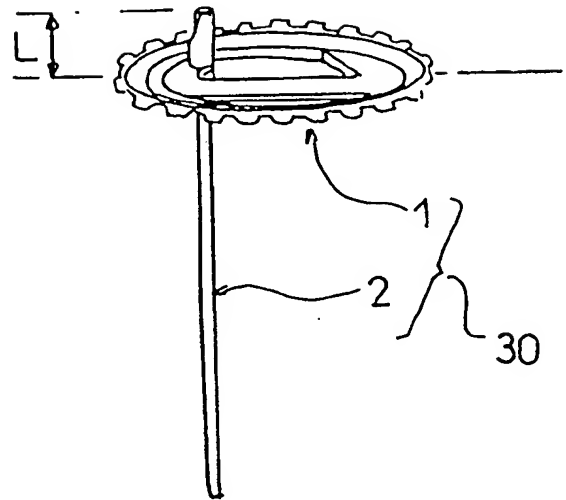


FIG 15

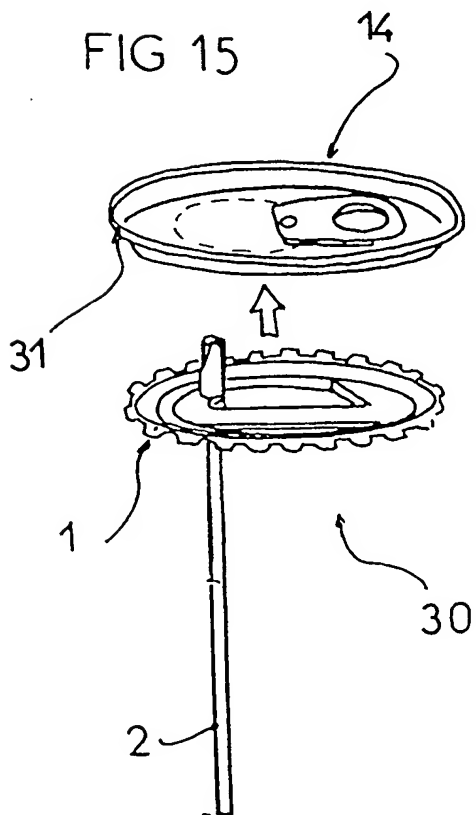
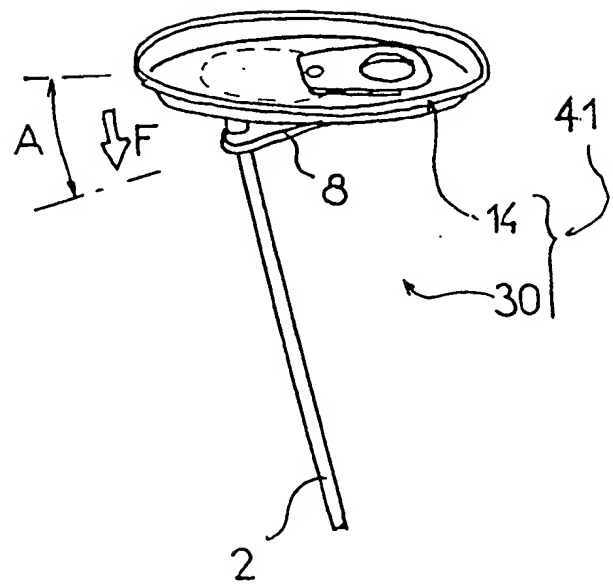


FIG 16



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FIG 17

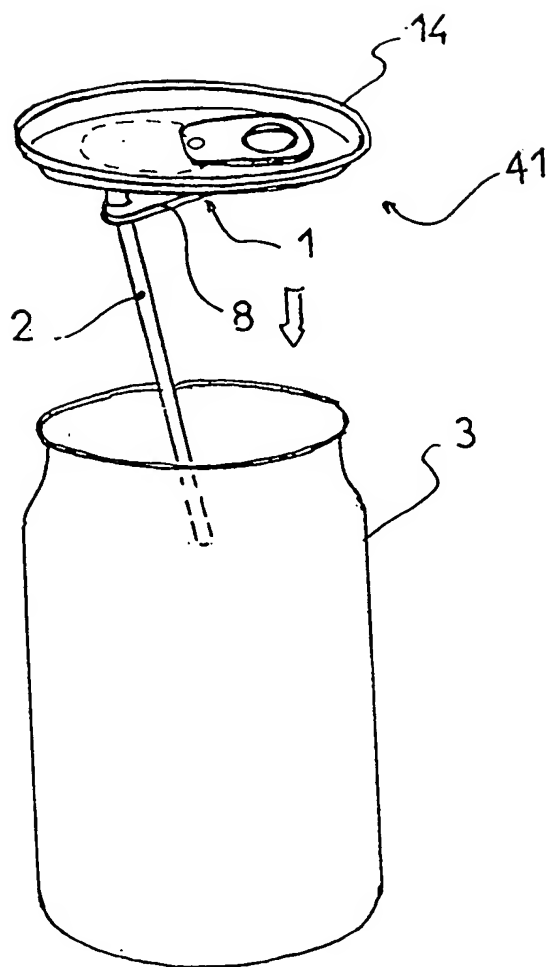
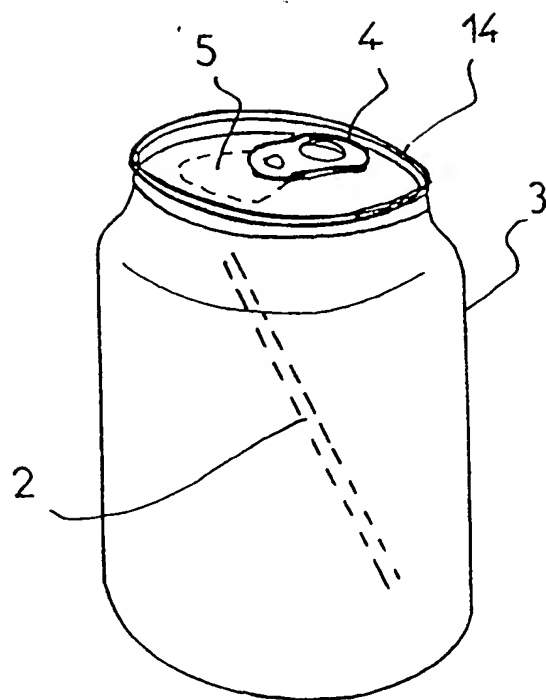


FIG 18





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FIG 19

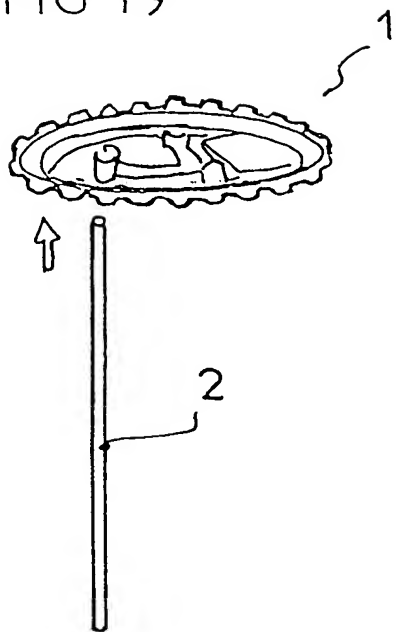


FIG 20

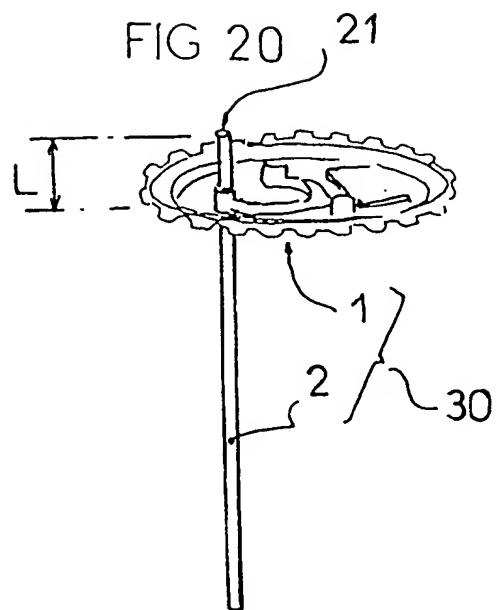


FIG 21

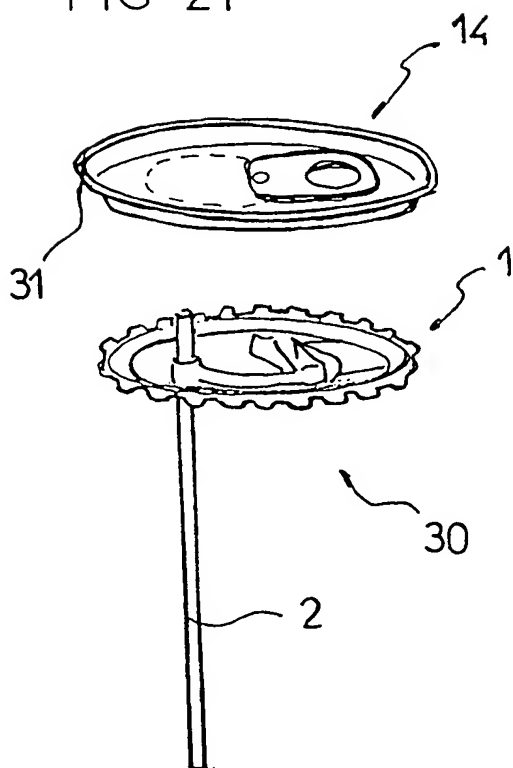
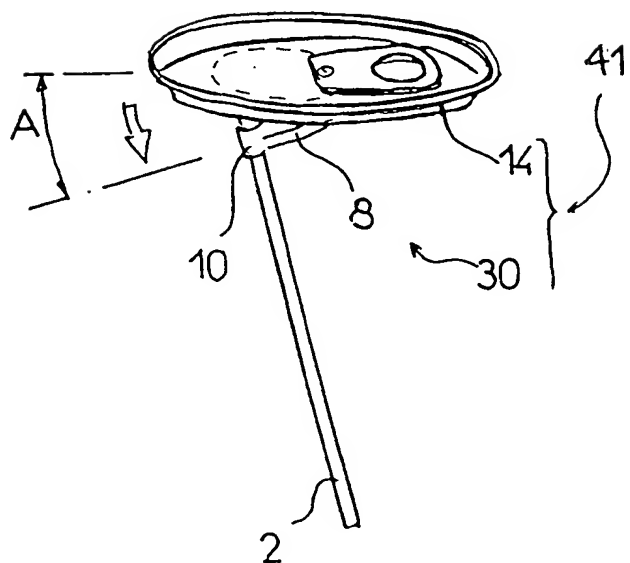


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FIG 23

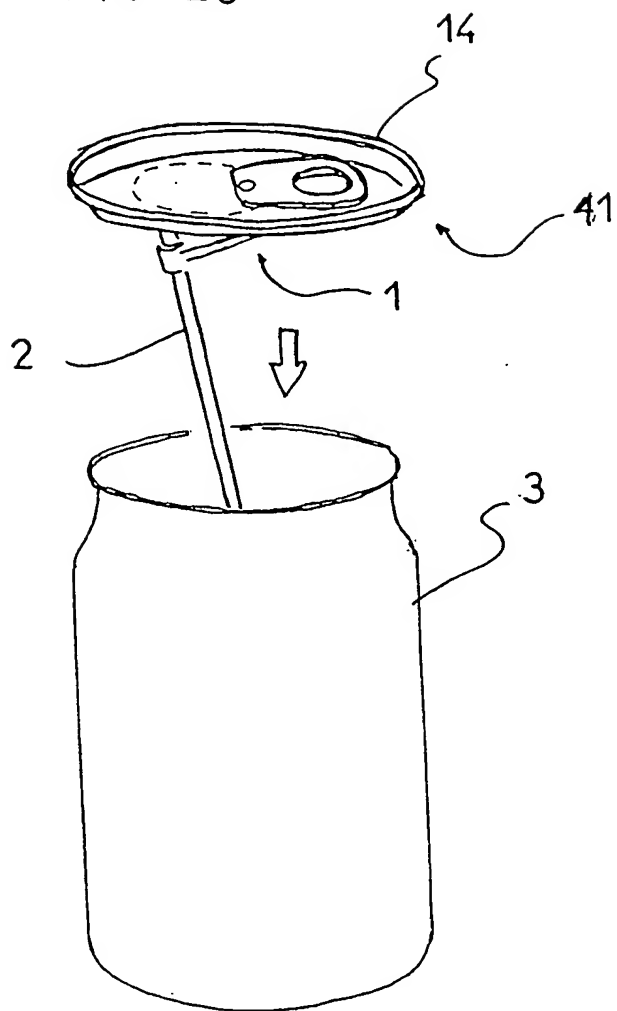
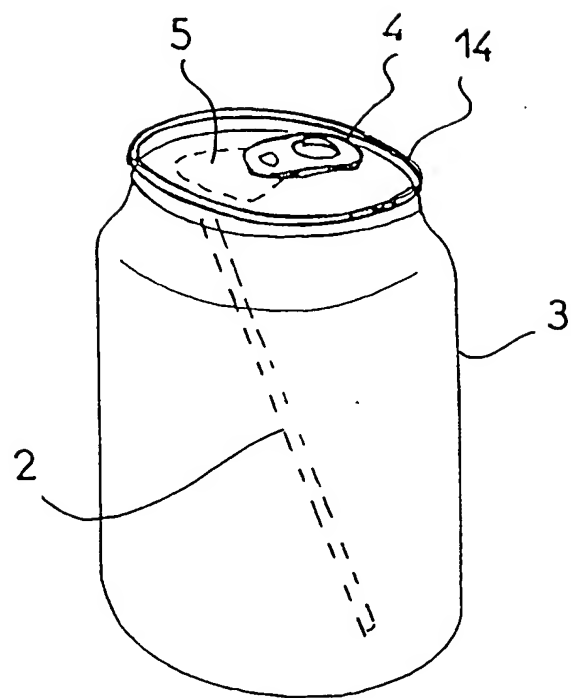


FIG 24



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FIG 25

